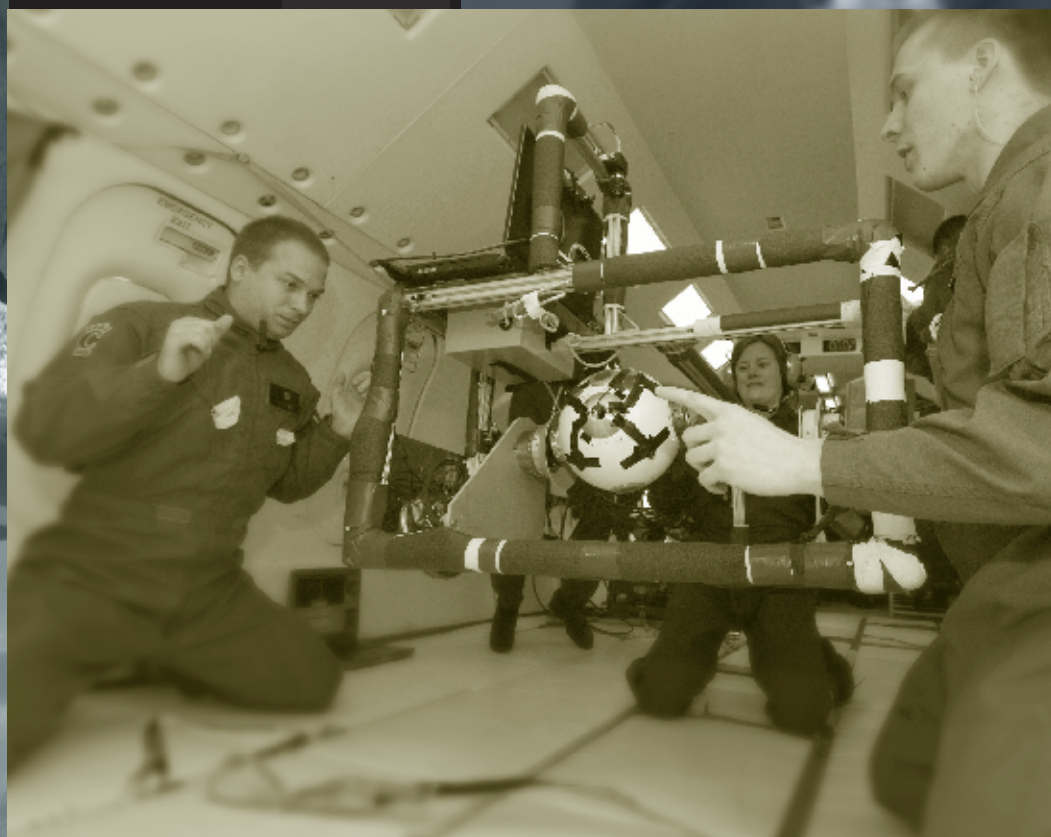
National Aeronautics and Space Administration

2009 JSC EDUCATION ANNUAL REPORT



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a LETTER from the JSC CENTER DIRECTOR

JSC Education is committed to sharing the excitement of Human Space Flight with our teachers, students, parents and community members implementing the goal of increasing interest in Science, Technology, Engineering and Mathematics (STEM) careers. Will we be able to look back in 10 years and say that what we did "made a difference"? That's our plan. Our team of dedicated employees reach out into the dynamic world of NASA and pull threads of knowledge to inspire, engage, educate and employ our students of today to encourage them to become our explorers and innovators of tomorrow.

The future of the United States lies within our youth and NASA is steadfast in its role with education. We support the intricate education system, while understanding the challenges and requirements that teachers and students face every day, accepting that it takes a community to raise a child, not just a school. As a STEM employer in the U.S. it is our responsibility to encourage excitement in STEM to keep America at the forefront of innovation.

Our programs cover a wide scope from Kindergarten through Higher Education, with a strong emphasis on Middle School teachers, High School students and Undergraduate interns. As we move through the pipeline of education, the investment per participant increases while the interest in STEM grows stronger. Our emphasis with teachers allows for a broader reach to the multitude of students they touch every day.

In the upcoming year, we are very excited about opportunities to reach even more students and educators through our agency Summer of Innovation activities. This focus will target middle school students and educators in an intensive summer learning program including follow-on experiences and assessment. With the retirement of Shuttle and the transition of the International Space Station to a National Laboratory, education has access to the unique micro-gravity environment onboard ISS to share research opportunities with all levels of students and educators.

This publication is dedicated to each and every JSC employee who touched a student's life and gave them confidence and encouragement in their studies. While we share our past year of the JSC Education Office successes, we realize there are multitudes of others who reach out and give of their time. Our mentors, volunteers, subject matter experts, education staff, and senior leadership always find time to "go the extra mile" for education. Together we are touching lives and making a difference.

Thank you for your support,

Michael L. Coats
Director, Johnson Space Center

NASA EDUCATION

NASA's Johnson Space Center in Houston, Texas, strives to improve STEM education while increasing interest and awareness in all NASA careers. JSC's Education Office offers programs for students and educators, classroom materials and numerous partnerships with other educational entities.

STUDENT EDUCATIONAL OPPORTUNITIES

JSC's Education Office offers various types of student educational opportunities throughout the year, including onsite programs, research programs and digital learning programs for students from kindergarten through the university level.

STUDENT EMPLOYMENT OPPORTUNITIES

The Education Office provides high school and college students the opportunity to gain real-life experience alongside NASA engineers, scientists and business professionals. This hands-on work experience helps develop qualified and diverse graduates to meet future workforce needs and really helps students launch their careers.

TEACHER OPPORTUNITIES

JSC's Education Office offers programs for educators. Opportunities include onsite workshops, traveling clinics and digital learning programs aimed at helping teachers implement NASA's unique content into their science, math and technology instructional materials.

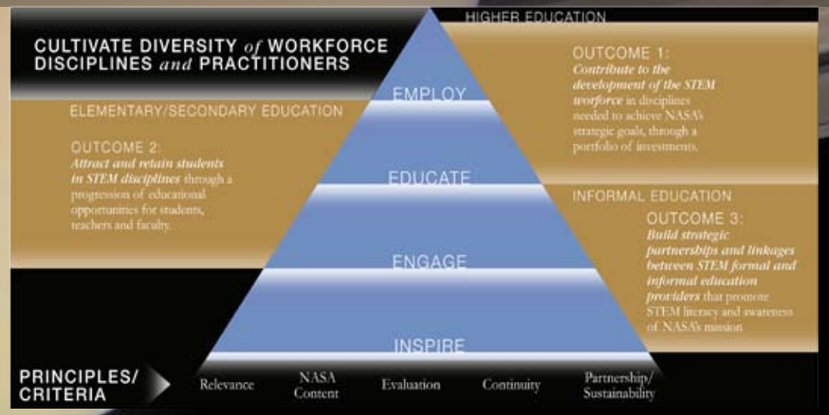
NASA Education

NASA's journeys into air and space have deepened humankind's understanding of the universe, advanced technology breakthroughs, enhanced air travel safety and security, and expanded the frontiers of scientific research.

These accomplishments share a common genesis: education. As the United States begins the second century of flight, the Nation must maintain its commitment to excellence in STEM education to ensure that the next generation of Americans can accept the full measure of their roles and responsibilities in shaping the future. NASA will continue the Agency's tradition of investing in the Nation's education programs and supporting the country's educators who play a key role in preparing, inspiring, exciting, encouraging, and nurturing the young minds of today who will be the workforce of tomorrow.

NASA continues to pursue three major education goals:

-- Strengthening NASA and the Nation's future workforce
-- Attracting and retaining students in STEM disciplines
-- Engaging Americans in NASA's mission



JSC EDUCATION PROJECTS 2009

JSC Education strives to reach students, educators and the general public through a variety of projects. These projects reach not only the area surrounding JSC, but also JSC's 8-state region and the entire country.

The activities found within these projects focus on STEM related topics and include things like professional development for educators, hands-on activities for students, unique NASA experiences, student internship and employment opportunities, and online learning. A brief overview is provided of each project managed or operated through JSC Education.

Teacher opportunities

NATIONAL PROJECTS

Aerospace Education Services Project (AESP): AESP offers professional development efforts, educator training and identification of NASA resources to the formal and informal education communities in all fifty states and the U.S. territories.

NASA Explorer Schools (NES): NES brings sustained involvement with NASA's education programs through professional development, student programs, and family/community events for educators, administrators, students and families.

Steckler Space Grant: This project awards grants of increasing value to institutions addressing innovative, meaningful, and enduring research and technology development activities that could enable space colonization or space settlement.

STATE PROJECTS

Educator Resource Center (ERC): The ERC demonstrates and facilitates use of NASA educational technologies and provides training using NASA curriculum materials to educators.

Middle School Aerospace Scholars (MAS): MAS offers middle school educators a one-week training workshop at JSC where the goal is for the educators to return to their classrooms and encourage their students to study STEM courses.

Student opportunities

NATIONAL PROJECTS

Digital Learning Network (DLN): DLN provides interactive programming, via videoconferencing and web casts, that inspires students to pursue STEM disciplines while learning more about our home planet and human space exploration.

Graduate Student Researchers Program (GSRP): GSRP is an agency-wide fellowship and internship program for graduate study leading to masters or doctoral degrees in a STEM field, related to NASA research and development.

Interdisciplinary National Science Program Incorporating Research Education Experiences (INSPIRE): INSPIRE is a national student pipeline program linking Elementary and Secondary Education Programs to Higher Education by encouraging students to pursue STEM education and careers for 9th thru 12th grade students.

ISS National Lab (ISS NLE): JSC was awarded the privilege of managing the ISS NLE for NASA Education in collaboration with the ISS National Lab Project Office. The project mission is to share the unique laboratory of the ISS with educators and students, primarily in collaboration with other federal agencies, nonprofit organizations, industry and community partners, to increase interest in STEM.

Learning Technologies (LT): LT provides students with learning tools and educational experiences using virtual worlds, like Second Life and realistic games, like Astronaut: Moon, Mars and Beyond.

Minority University Research Education Program (MUREP): MUREP increases the Agency's responsiveness to federal mandates related to minority institutions via competitive award programs, faculty fellowships and student intern activities.

Motivating Undergraduates in Science and Technology (MUST): The MUST program awards scholarships and internships to undergraduates pursuing degrees in science, technology, engineering and mathematics, particularly focused on engaging students from underserved and underrepresented groups to enter STEM fields.

University Research Center (URC): MUREP URC's, via competitive awards, increase aerospace research capability among the nation's Minority Institutions (MI) that is consistent with NASA's vision for aeronautics and space exploration.

NASA Aerospace Scholars (NAS): NAS is a multi-state partnership between Johnson Space Center and individual states offering an on-line course and summer workshop as inspiration to increase the number of high school students entering STEM degrees and careers.

Pre-Service Teaching Institute (PSTI): PSTI is an intensive, 2-week summer residential session designed to increase the student's skills in teaching mathematics and science while incorporating technology into the curriculum for Early Childhood and Elementary Education majors.

Reduced Gravity Education Flight Program (RGEFP): RGEFP provides unique academic experiences to successfully propose, design, fabricate, fly, and evaluate reduced gravity experiments over the course of four to six months for undergraduate students and educators.

Space Grant Interns: Space Grant Consortiums from all over the US coordinate and fund internship opportunities at NASA and private industry partners for undergraduate students.

Systems Engineering Education Discovery (SEED): Utilizing a variety of existing programs and new tools, the SEED project is designed to lead the Agency in development and growth of a new generation of systems engineers better prepared to contribute immediately upon entering the workforce.

Teaching From Space (TFS): Teaching From Space manages NASA's Education Flight Projects, a national K-12 project, and facilitates and funds opportunities for educators and students that utilize unique NASA content, facilities, and people.

Undergraduate Student Research Program (USRP): USRP is an agency-wide program that offers full-time, mentored internships in NASA research and engineering activities to undergraduate science and engineering students.

STATE PROJECTS

Career Exploration Program (CEP): CEP provides internship opportunities that encourage STEM career interests and teach job skills within the NASA Johnson Space Center for high school seniors and college students.

Education Outreach Program: JSC's Education Outreach Program promotes interest in science, engineering, mathematics and technology by having volunteers participate in various outreach opportunities for students.

Informal Education: Informal Education projects and activities are reflected in the relationship between NASA Johnson Space Center, museums, science centers, and informal educational groups (i.e. scouts, after school, camp programs, etc.) in our 8 state region. We provide access to NASA educational materials, support to special events and exhibitry, and commit in kind NASA resources to grant applicants who want us to partner with them on STEM related educational grant announcements. Community Events, Education Outreach, and professional development opportunities are supported through our partnerships with informal institutions and programs.

Texas Aerospace Scholars (TAS): TAS encourages Texas students to explore the unlimited career possibilities in STEM with space exploration as its central theme.

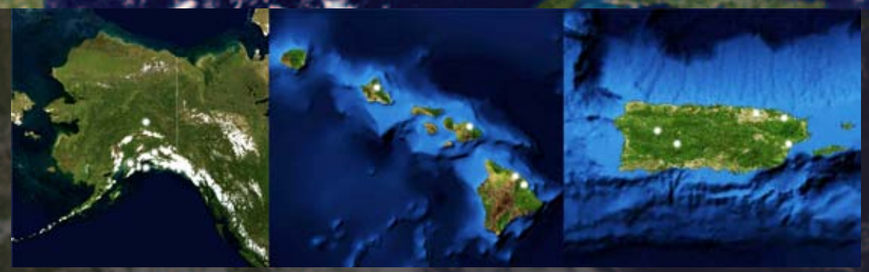
High School Aerospace Scholars (HAS): HAS is an interactive on-line learning experience where Texas high school juniors are encouraged to study STEM related fields, highlighted by a six-day internship at JSC where students work with NASA engineers and scientists to develop a mission to Mars.

Community College Aerospace Scholars (CAS): CAS encourages Texas community college students to explore the possibilities of careers in STEM while engaging in activities to explore engineering first hand.

Texas Aerospace Scholars (TAS) Interns: Texas Aerospace Scholars Internship attracts outstanding students that have participated in the High School (HAS) or Community College Aerospace Scholars (CAS) and are pursuing an undergraduate degree in a STEM-related degree field.

JSC EDUCATION IMPACT 2009

JSC Education strives to reach the most diverse and brightest minds across the country with its education projects. The impact that JSC Education creates can be seen on a local, state, regional, national and international level. The map represents the impact points with a place where an individual or group interacted with a JSC-managed Education Project in 2009.

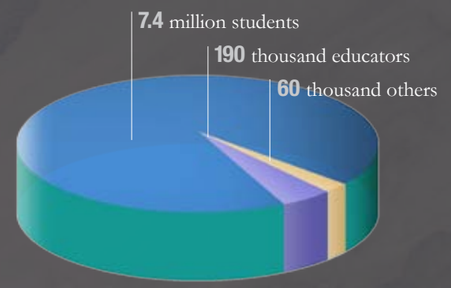


AUSTRALIA BELGIUM BRAZIL CANADA CHINA FINLAND FRANCE GERMANY GREECE INDIA ITALY JAPAN KOREA MALAYSIA MALI MEXICO NETHERLANDS NEW ZEALAND PERU POLAND PORTUGAL RUSSIA SENEGAL SPAIN SWEDEN SWITZERLAND U.K. U. S.

PROJECT	# OF STUDENTS REACHED	# OF EDUCATORS REACHED	# OF OTHERS REACHED
EDUCATOR OPPORTUNITIES			
AESP	10,411	7,096	12,616
NES	11,500	838	25,000
Steckler	109	74	2500
ERC		4,011	
MAS	13,750	53	10
STUDENT OPPORTUNITIES			
DLN	26,568	2,309	1,358
Education Outreach[1]	33,435		
GSRP	16	20	1,400
INSPIRE	40		
Learning Technologies[1]	17,000		
MUREP	2,175	180	12,150
MUST	11		
URC	76	15	7
NAS[2]	1,061	60	121
PSTI	21	4	100
RGEFP	228	61	7650
Space Grant Interns	12		
TFS[3]	7,325,148	179,078	
USRP	343		100
CEP	72		
Informal Education	9,575	571	825
HAS	799	35	121
CAS	173	40	25
TAS Interns	13		
TOTALS	7,452,536	194,445	63,983

JSC EDUCATION IMPACT 2009

JSC Education's impact can be seen through the number of students, educators and other community members that we interact with throughout our numerous projects. In 2009, JSC Education reached over 7.4 million students, 190 thousand educators, and 60 thousand other community members. Through its efforts JSC Education brought over 7.5 million people in contact with NASA's continuing mission of space exploration and will continue to reach more students, educators and other people each day.



1: Total number does not differentiate between students/educators/others
2: Total number reflects counts from HAS/WAS/VASTS
3: Total numbers inlcudes one-time event with Channel 1 that reached ~6 million students/~150 thousand educators
State Project
National Project

JSC EDUCATION HIGHLIGHTS 2009

Throughout 2009 JSC Education accomplished many activities and reached new heights with its projects. Whether it was celebrating project milestones, developing new technology and conducting ground breaking research, or interacting with thousands of people in one of a kind event, 2009 was an amazing accomplishment for JSC Education. The best and brightest moments of 2009 are spotlighted.

① HAS 10 Year Anniversary

High School Aerospace Scholars (HAS) encourages high school juniors to explore the exciting possibilities of STEM careers by using space exploration to engage students in online curriculum throughout the school year and offering first-hand engineering experiences at NASA Johnson Space Center during the summer. While at JSC, students work side-by-side with NASA engineers and scientists to develop a manned mission to Mars. After 10 years of the program over 9,000 Texas residents have participated in HAS and we consistently receive positive feedback on the value of the program.

② Space Week 2009

The Office of External Relations, along with 35 volunteers, and many of our JSC Education Subcommittee contractors ascended on Austin for Space Day 2009 to honor Texas Aerospace Scholars, a partnership between the State of Texas and JSC. NASA provided hands-on activities and experiences for public school and home school students, parents and teachers on the Capital Lawn and the Lyndon B. Johnson Presidential Library. Students drove mini robotic rovers, launched home-made rockets, answered space trivia, discovered space food and space suit technology, watched science demonstrations, and walked through our Driven to Explore Trailer.

③ HESTEC

Hispanic Engineering Science and Technology (HESTEC) Program is organized by the University of Texas-Pan American (UTPA) in conjunction with the Office of Congressman Rubén Hinojosa. HESTEC is a year-round program and NASA participates in a culminating weeklong conference held on the UTPA campus promoting STEM. This year, the Congressional Roundtable Panel reached approximately 1,000 superintendents, educators, and counselors. NASA personnel reached 180 educators through space related professional development workshops and 130 mothers and daughters on Latina Day. The NASA Exhibit Hall on Community Day this year hosted 11,000 guests within a five-hour period.

④ STS-119

Focusing on spacesuits and spacewalking, Teaching From Space developed a comprehensive education strategy to engage a national audience of educators and students in the STS-119 mission. During the mission, educators and Mission Specialists Joe Acaba and Ricky Arnold completed several spacewalks. The education plan involved all 10 NASA centers focused on a one-stop shop for spacesuits and spacewalking for educators and students through an educator kit, website, workshops and eProfessional development opportunities.

⑤ SEEC

Where do teachers go to receive new "out of this world" ideas to use in their classrooms? They go to the Space Exploration Educators Conference, held every February at Space Center Houston. Teachers attend workshops learning hands-on activities related to space science and space exploration to help ignite the imagination of their students. The three day conference was attended by over 600 teachers from across the United States, Japan, the United Kingdom and Canada. To date, over 9,500 teachers have been trained to bring "Space into the Classroom" at SEEC.

⑥ Research

The Reduced Gravity Education Flight Program paired undergraduate engineering students from around the country with NASA projects that were systems engineering and reduced gravity related. Under the leadership of a NASA Principal Investigator, students from eight separate universities completed research projects over the course of 6-9 months and gathered their final data in a reduced gravity flight environment. This project fed needed research results directly into NASA projects and provided students with a real-life hands-on engineering experience. Research topics ranged from Lunar surface traction to aerospace materials flammability.

Steckler Space Grant Research opportunity awarded 18 cooperative agreements to 16 different educational institutions across the US with the overall goal of supporting Space Colonization. Working with the Exploration Systems Mission Directorate on the $1.25M awards, many of the projects provide a dual benefit to exploration and to Earth conservation, such as focusing on water recycling, food production and power storage.

⑦ Interns and CONNECT

The Office of Education contributes to current and future workforce needs by placing over 200 interns in engineering, science, administrative and clerical positions. The sum of those semester and summer internships equals the work of 80 full-time employees. With the expansion of JSC Connect to all 21 Internship programs, the Office of Education provides a single point of entry for students and mentors alike. Connect links student applications, mentor project descriptions, student placement, and student tracking into a single web-based system. Over 4,000 students from 400 universities applied to JSC internships, reflecting diversity in educational majors, gender and ethnicity.

⑧ URC

The University of Texas-El Paso (UTEP) is one of six minority universities selected to receive $1 million per year for five years as a NASA University Research Center (URC). UTEP will establish multi-disciplinary engineering and scientific research that will contribute to NASA programs. In February a kick-off was held at UTEP to officially recognize their new URC, UTEP's Center for Space Exploration Technology Research (cSETR). JSC also participated in UTEP's Engineering Week speaking to pre-college students, teachers and parents reaching approximately 400 students and visitors.

⑨ Apollo 11

Celebrating the 40th Anniversary of the Apollo 11 mission, Space Center Houston and JSC Education held events including "Voyage to the Moon" educator workshops and a community night. Educators were provided new classroom content based on the solar system, lunar samples, space suits, an inflatable planetarium, and given a broad perspective on our moon and beyond. Community members and their children were given free access to the Lunar sample lab at SCH, a tour of the Saturn V building by subject matter experts, and six hands-on activities related to rockets, telescopes, and moon rocks.

⑩ NASA Aerospace Scholars Expansion

In 2009, JSC committed to creating NASA Aerospace Scholars, a formal structure to provide guidance and support to partners replicating High School Aerospace Scholars in their states. High School Aerospace Scholars is a robust year long program for high school juniors using space exploration as its inspiration. Through Space Act Agreements, JSC has shared the project with Washington, Virginia, and Idaho and is currently working with several other states. We support with ready-to-go curriculum and each state customizes the program to meet their needs.

⑪ DLN

The Digital Learning Network planned and coordinated a "Back to School" Webcast in conjunction with the President's national broadcast to students, which highlighted employees and their careers at each NASA Center. JSC highlighted the career of a JSC Aerospace Engineer who initially came to NASA as a co-op through the Texas Aerospace Scholars program. The DLN also connected to two schools from the United States and one from Iceland to celebrate the 40th anniversary of the Apollo 11 lunar landing. In this highly interactive program, students from around the world learned about astronaut training, mission control, and the logistics involved in a lunar landing.

⑫ PSTI

During this year's Pre-Service Teacher Institute, elementary and middle school teachers were transformed from science phobic to science excited. College students from diverse backgrounds spent a dynamic and exciting time at NASA Johnson Space Center where they were exposed to aerospace, mathematics and science enrichment activities. Prior to their arrival, teachers were given a design challenge and they experienced the same anticipation and uncertainty as their students. During the workshop, the teachers learned techniques and were given resources to build their confidence in teaching science.

For more information, visit:
http://education.jsc.nasa.gov